



## A Comprehensive, Self-Contained System That Familiarizes Students With Hydraulic Technology and its Applications

TII's instructor-developed curriculum is flexible and features 25 to 30 hours of instruction in hydraulic components, applications and principles. The modular format allows self-teach/self-paced or group instruction. The Physical Properties section combines science and technology as in programs like the Principles of Technology.

Each lesson requires students to conduct an experiment in hydraulic technology using one or more of the 18 industrial-grade hydraulic components, including different types of valves, cylinders and measuring instruments. In the Application Laboratories section of the manual, students use the components to emulate industrial applications.

A complete power supply with a pump and fluid reservoir, together with a work surface and the components conveniently stored on a panel, provide everything needed to understand this fluid power technology. The pump is designed to operate at approximately 25 PSI for classroom safety.

The Principles of Hydraulics learning system is one building block in the TII Fundamentals of Technology system. Other modules address the principles of mechanisms, pneumatics, robotics, sensors, programmable controllers, computer interfacing and systems integration. All systems feature:

- Instructor and student versions of the curriculum; the instructor guide includes lesson preparation and presentation suggestions
- Easy-to-read curriculum with three levels of instruction: introduction to components, industrial applications and physical properties
- Student mountable components that maximize comprehension and manual dexterity
- Impact-resistant, lockable and portable case for use in different classrooms or buildings
- Clearly labeled storage panel for component identification and inventory
- Removable panels for mounting the system on a table or in a carrel to meet space requirements

## SPECIFICATIONS

The entire learning system is enclosed in a portable and lockable impact-resistant polyethylene storage case. It consists of an experiment station, a component kit, a visual aids chart and a set of courseware that includes a student activity manual and an instructor's reference guide.

### Experiment Station

The steel reinforced interior lower panel contains a complete hydraulic power supply and circuit mounting plate. The power supply includes a sealed 1/2" clear cast acrylic reservoir with a 3-port return manifold, a centrifugal pump (with relief line) set at 25 PSI maximum for classroom safety, and a regulated (0 to 100 PSI) 2-port distribution manifold. The circuit mounting plate is made of a 1/2" extruded and anodized aluminum T-slot slider bar and includes three component mounting brackets and two cylinder mounting brackets. The entire experiment station can easily be removed from the case for table-top use.

### Component Kit

The kit includes 18 components and instruments to provide a solid understanding of hydraulic technology and how it is applied in the real world. It also includes 11 hoses. Most components are clear for internal observation. They are student mountable for versatility in building circuits and designing applications as well as for promoting dexterity in their use. All devices have industrial/ laboratory grade poppet check quick-disconnect fittings. The hoses and components are pre-charged with oil. The component storage panel is color coded, clearly labeled and silhouetted for component identification and inventory. The components are securely mounted but can be released quickly, and the panel is removable for wall mount or table-top use.

## CURRICULUM

The Principles of Hydraulics curriculum was designed and reviewed by a panel of experienced high school and community college teachers. Courseware includes an instructor's reference guide and a student manual with 25 units of activities and instructional support. The 8 to 10 hours of introductory instruction are ideally suited for exploratory Technology Education programs. Each of the three necessary levels of instruction includes background study of the topic, observational and hands-on experiments, application exercises, and mathematical formulas for proving results. Students will also develop skills in problem solving, data management, hydraulic concepts and unit conversion.

A 10 activity modular format is also available.

### Introduction to Hydraulic Components

- Trainer Familiarization
- Introduction to Hydraulic Systems
- Hydraulic Fluids
- Filtration Systems
- Hydraulic Pumps
- Pressure Control Devices
- Manual Directional Control Valves
- Check Valves
- Needle Valves
- Hydraulic Cylinders
- Hydraulic Flow Control Valves

### Application Laboratories

- Paired Cylinders in a Circuit
- Hydraulic Press Application
- Hydraulic Jack Application
- Hydraulic Logic-Positioner Application
- Hydraulic Symbols and Schematics

### Physical Properties \*

- Hydraulic Force Transformers
- Flow Rate in Hydraulic Systems
- Force in Hydraulic Systems
- Work Done with Hydraulic Systems
- Power in Hydraulic Systems
- Fluid Resistance in Pipes
- Energy in Hydraulic Systems
- Glossary
- Appendix

*\* The Physical Properties section of the curriculum has been designed to correlate to the objectives in Principles of Technology by the Center for Occupational Research and Development.*

For more information, customer service and technical assistance, call toll-free: 1-800-451-2169

TII Technical Education Systems  
56 E End Drive, Gilberts, IL 60136 USA  
P: 847-428-3085 F: 847-428-3286  
[www.tii-tech.com](http://www.tii-tech.com)